## REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application. Claims 1-7 are currently pending in this application. Claim 4 has been cancelled. Claims 5-6 have been withdrawn from consideration. No new matter has been added by way of the present amendment. For instance, the amendment to claim 1 is supported by the Specification at, for example, pages 13, 15 and 36-39. Accordingly, no new matter has been added.

At the outset, the present application is believed to be in condition for allowance. Entry of the accompanying amendment is requested under 37 C.F.R. §1.116, as the amendment does not raise any new issues which would require further search and/or consideration by the Examiner. Furthermore, Applicants request entry of this amendment in order to place the claims in better form for consideration on Appeal.

In view of the amendments and remarks herein, Applicants respectfully request that the Examiner withdraw all outstanding rejections and allow the currently pending claims.

### *Issues Under 35 U.S.C. § 102(b)*

Claims 1-4 stand rejected under 35 U.S.C. 102(b) as anticipated by Andrieu et al. (U.S. 6,261,721) (hereinafter Andrieu '721). Applicants respectfully traverse.

The Examiner asserts that Andrieu '721 teaches a cell separator comprising a microporous polymer having pores with an average pore diameter of 0.1$\mu$m to 5$\mu$m, and obtained by processes such as phase inversion or conversion. The Examiner further asserts that

Andrieu '721 teaches a porous film base comprising a multiplicity of communicating micropores (Office Action; pp. 2-3, paragraph 4).

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of anticipation. For anticipation under 35 U.S.C.§102, the reference must teach each and every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present". *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949 (Fed. Cir. 1999). The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *Id.*

The present invention is directed, *inter alia*, to a porous film with chemical resistance, comprising a film base produced by a phase conversion method in which mixtures containing the polymers are cast as films and then introduced to solidifying liquids, and a chemical-resistant polymeric compound covering the porous film base. The present porous film comprises a multiplicity of communicating micropores having an average pore size of 0.01 to 10 $\mu$m.

Present claim 1 (and dependent claims thereof) requires that an average rate of open pores inside the porous film (porosity) is 30% to 80%, and an amount of the coat of the chemical-resistant polymeric compound is 0.01 to 50 percent by weight relative to the porous film. Andrieu '721 fails to teach these limitations.

As discussed at pages 38-39 of the present Specification, an excessively large amount of the chemical-resistant polymeric compound may result in clogging of micropores or reduce the

communication between the micropores. In contrast, an excessively small amount of the chemical-resistant polymeric compound may result in insufficient coating or uneven coating of the surface of porous film base.

However, the porous structure of the porous film of the present invention maintains its porous structure having a multiplicity of communicating micropores even when covered with a phenolic resin. For example, the porous film according to Example 3 exhibits a thickness of about 50 μm, an average pore size of about 1 μm, a porosity of about 70% and permeation performance at the same level as the raw material "Porous Film Base 1". Similar results were obtained in other Examples (see page 60, lines 17-24 in the specification).

The porous films according to the present invention can also maintain the properties of the porous film base without deterioration. For example, physical properties of the porous films according to the present invention, such as porosity, pore size, Gurley air-permeability, and pure-water permeation rate, are substantially at the same levels as those of the constituting porous film base (see, e.g., page 15, lines 6-13 in the specification), as shown below.

Example 14

In Example 14, the raw material ("Porous Film Base 1"), which was used as the porous film base, comprised an amide-imide polymer and had an average pore size of about 1.1 μm and an inner porosity of 70%. The amount of the coating phenolic resin (a chemical-resistant polymeric compound) was about 11 percent by weight of the resulting porous film.

(i) The volume of 1g of the porous film base is calculated on the basis of the density of a polyamide-imide of 1.45 g/cm$^3$ to be 0.67 cm$^3$ (1g÷1.45 g/cm$^3$). The total volume of the

pores in 1g of the porous film base is calculated on the basis of 70% of inner porosity as 0.48 $cm^3$ (0.67 $cm^3\times0.7$). The total volume of the pores is represented by the formula, $4/3\pi r^3\times n$, wherein r is an average pore radius, and n is a number of pores in 1g of the porous film base.

(ii) The average pore radius r as calculated on the basis of the average pore size of about 1.1 μm is 0.55 μm. The total surface area of pores, represented by the formula $4\pi r^2\times n$, is calculated by using the formula: (total volume of the pores)×3/r, to be $2.6\times10^4 cm^2$ (0.48 $cm^3\times3/(0.55\ \mu m)$).

(iii) The weight of the coating phenolic resin (the chemical-resistant polymeric compound) in 1g of the resulting porous film is calculated on the basis of about 11 percent by weight of the amount of the coating phenolic resin to the resulting porous film. The result is 0.11g. The volume of the coating phenolic resin in 1g of the resulting porous film, as calculated on the basis of the density of a phenolic resin of 1.2 $g/cm^3$, is 0.09 $cm^3$ (0.11g÷1.2 $g/cm^3$). The thickness of the coating phenolic resin is calculated as $0.09cm^3\div(2.6\times10^4cm^2) = 0.03\times10^{-4}cm = 0.03\mu m$.

As shown above, in the present invention, the thickness of the coating layer is extremely thin. In Example 14, the average pore size of the porous film base is 1.1 μm, and the average pore size of the porous film coated by the chemical-resistant polymeric compound is 1.04 μm (1.1- 0.03×2).

Andrieu '721 discloses: "The pores or interstices of the matrix and of the polymer have average diameters enabling the polymer to occupy the pores or interstices of the matrix. In general, the ratio of the average pore diameter of the macroporous matrix to the average pore diameter of the microporous polymer is in the range from 2 to 50, and this ratio is conventionally

in the order of 10" (see column 2, lines 37-44 in Andrieu '721). Further, Andrieu '721 teaches that "[t]he polymer concentration is one of the parameters that condition the final porosity" (see column 3, lines 49-51 in Andrieu).

Clearly, as noted above, the porous film of the present invention can maintain the properties of the porous film base without deterioration. Andrieu '721 does not teach or suggest this limitation.

Moreover, present claim 1 and dependent claims thereof require that the coat of the chemical-resistant polymeric compound covering the porous film base is formed by subjecting a solution of the chemical-resistant polymeric compound to a coat forming procedure.

Andrieu '721 teaches a processes of forming a microporous polymer by using a non-solvent (see column 2, line 61 to column 3, line 24; column 5, line 52 to column 6, line 2; and column 6, lines 41-45 in Andrieu '721). However, the presently claimed process of forming a chemical-resistant polymeric compound covering the porous film base does not use a non-solvent, but instead uses a solvent which can dissolve the polymeric compound or a precursor thereof (see page 36, lines 16-20 in the specification).

As a result, in Andrieu '721, the microporous polymer is porous, typically has a pore volume in the range of 35% to 95%, and typically has pores with an average diameter in the range of 0.1 μm to 5μm (generally in the order of 1μm) (see column 2, lines 3-6 in Andrieu).

In contrast, in the present invention, the thickness of the chemical-resistant polymeric compound covering the porous film base is extremely thin, as discussed above (for example, 0.03μm in Example 14). Thus, the present chemical-resistant polymeric compound covering the porous film base is not porous, and substantially has no pores.

There are a variety of requirements for porous films, such as heat resistance, flexibility, hardness, color, easiness in production, pore size, porosity, porous structure, price, strength, and chemical properties, and it is difficult to choose constitutive materials that satisfy all of these requirements in good balance (see page 2, lines 18-24 in the specification). The present inventors have found that a porous film that is excellent in chemical resistance and contains a multiplicity of communicating micropores can be obtained by covering a porous film with a polymer having excellent chemical resistance. The present invention has been achieved based on these findings (see page 3, lines 10-16 in the specification).

In the present invention, the final porosity is controlled by the porosity of the starting porous film base, and the final chemical resistance property is controlled by the chemical resistance property of the chemical-resistant polymeric compound.

In contrast, in Andrieu '721, both the final porosity and the chemical resistance property are controlled by the porosity and the chemical resistance property of the microporous polymer. Therefore, the final porosity is controlled by the porosity of the microporous polymer, not the porosity of the macroporous matrix. The macroporous matrix in Andrieu '721 is substantially rigid (column 2, lines 23-24 in Andrieu '721), and is only a support having increased mechanical resistance to crushing.

Clearly, Andrieu '721 fails to teach each and every limitation of the present invention and thus fails to anticipate the same.

Reconsideration and withdrawal of this rejection are thus respectfully requested.

*Issues Under 35 U.S.C. § 102/103(a)*

Claim 7 stands rejected as being anticipated by, or in the alternative, as obvious over Andrieu '721. Applicants respectfully traverse.

As discussed above, Andrieu '721 fails to teach a porous film with chemical resistance, comprising a film base produced by a phase conversion method in which mixtures containing the polymers are cast as films and then introduced to solidifying liquids, and a chemical-resistant polymeric compound covering the porous film base, wherein the porous film comprises a multiplicity of communicating micropores having an average pore size of 0.01 to 10 $\mu$m, the average rate of open pores inside the porous film (porosity) is 30% to 80%, an amount of the coat of the chemical-resistant polymeric compound is 0.01 to 50 percent by weight relative to the porous film, and wherein the porous film maintains the properties of the porous film base.

Moreover, Andrieu '721 fails to teach or suggest a porous film having a pure-water permeation rate of $3.3 \times 10^{-9}$ to $1.1 \times 10^{-7}$ $m.sec^{-1}.Pa^{-1}$ [i.e., 20 to 700 L/ ($m^2$.min.atm)], as presently claimed.

Evidently, the cited prior art fails to anticipate or render the present invention obvious. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

*Conclusion*

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and objections and that they be withdrawn. It is believed that a

full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact MaryAnne Armstrong, Reg. No. 40,069 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

By MA

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